

SUSTAINABILITY REPORTING (ESG) AND FIRM VALUE NEXUS: THE ROLE OF ACCOUNTING INFORMATION TIMELINESS

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Abstract

This study investigated the relationship between ESG reporting and firm value, with an emphasis on the moderating effect of accounting information timeliness on this relationship. Value-enhancing theory provided the theoretical bedrock, based on the argument that firms report sustainability activities to enhance value. Secondary sources were used to obtain data on 76 non-financial listed firms in Nigeria for the 2011-2023 financial years. The study employed Weighted Least Squares regression to address heteroscedasticity concerns. The study found mixed results because environmental and governance disclosures had a significant effect on firm value, but social disclosures did not. Again, accounting information timeliness had a significant negative effect on firm value, suggesting that the timeliness quality sent signals to investors about the reliability of the report and value of a firm. In addition, the lack of timely information significantly reduced the effect of sustainability reporting on firm value. The study concluded that accounting information timeliness made investors have confidence in the sustainability report and was therefore a good moderator of any negative impact of sustainability reporting on firm value. The study recommended the timely provision of accounting information and a sustainability report to avoid being penalized by investors in the capital market.

Keywords: *Accounting information timeliness, Environmental disclosure, Firm value, Governance disclosure, Social disclosure.*

INTRODUCTION

The increasing emphasis on environmental, social, and governance (ESG) reporting in recent times has put much pressure on corporations to enhance transparency and accountability in their financial information disclosures (KPMG, 2022; Eccles & Klimenko, 2019). However, the value-relevance of these disclosures still remains unclear, especially in the context of differences in the quality of accounting information across firms and time in emerging markets like Nigeria. Two research questions emanate from this issue: (a) How do ESG disclosures affect firm value? and (b) Does the timeliness of accounting information matter in the relationship between ESG disclosures and firm value?

Studies on the first question have sparked debate in the extant literature, with the main argument being whether firms report sustainability activities to enhance value or for the legitimacy of their operations (Atanda et al., 2021; Emeka-Nwokeji & Osioma, 2019). Firm value was measured using various accounting and financial metrics, including market value, Tobin's Q, return on assets (ROA), and return on equity (ROE). Similarly, the impact of the quality of accounting information on sustainability practices has remained inconsistent, causing concerns over the reliability and relevance of the disclosed information (Ishak, 2024). Despite increasing pressure for comprehensive sustainability disclosures, many Nigerian firms are still exhibiting a lack of rigor in reporting sustainability practices (Adekunle et al., 2022). The absence of standardized guidelines and the voluntary nature of disclosures have led to selective reporting and information asymmetry (Erin et al., 2021).

A preliminary survey of data indicated that only 40% of the companies listed on the Nigerian Exchange Group (NGX) regularly disclosed their sustainability practices in line with global standards, and a large proportion of them failed to provide timely updates (Madugba et al., 2020). Similarly, Okafor et al. (2025) reported general sustainability disclosure averaging 42.1%, economic disclosure of 23.5%, environmental disclosure of 15.5%, and social disclosure of 27.9% among listed firms in Nigeria using the 2021 version of the Global Reporting Initiative (GRI). Additionally, Erin et al. (2021) and Liu (2022) empirically established that delays in releasing sustainability reports resulted in a significant decrease in firm value, due to heightened investors' uncertainty and perceived risks. The core business issue is that untimely accounting information not only diminished stakeholders' trust and utility of annual reports and perceived value and credibility of a firm but also undermined the credibility of the financial markets in Nigeria (Adekunle et al., 2022). Therefore, managers, investors, and regulatory bodies need information on the moderating effect of accounting information quality on the relationship between sustainability reporting and firm value.

This study examines the moderating role of accounting information timelines on the effect of sustainability reporting on firm value. The study collected data from 76 nonfinancial listed firms in Nigeria on three dimensions of sustainability reporting (ESG), accounting information timeliness, and firm value for the periods 2011 to 2023. Focusing on this category of firms is justified by the growing importance of sustainability reporting as a critical aspect of corporate governance, the need for timely accounting information to enhance decision-making and investors' confidence, and the evolving new regulatory landscape regarding corporate reporting in Nigeria.

Managers of listed firms in Nigeria are now desirous of how to enhance the value of their firms. They therefore seek information on the factors that attract investors' confidence. This study is significant for decision-making by providing insights into how sustainability reporting and accounting information timeliness influence firm value. It provides the potential to understand

the critical role of timely sustainability reporting in enhancing investors' confidence and market valuation through which managers align corporate strategies with stakeholders' expectations and global sustainability trends. The study expands the application of value-enhancing theory by demonstrating how timely disclosure of accounting information serves as a signal to different stakeholder groups and ultimately influences firm value. The study provides robust evidence on the influence of sustainability reporting and accounting information timeliness on firm value, using econometric techniques and tools to analyze data.

In addition, the study provides evidence for the need to design or refine policies that encourage timely and comprehensive sustainability reporting to foster a more transparent and accountable corporate environment. The study, therefore, contributes to the need to align Nigeria's reporting standards with international best practices to support sustainable development. The rest of the paper is organised as follows. Section two reviews extant literature. In section three, the research procedures were explained, which consist of data and sources, model specification, variables, and how they were measured, data analysis tools, and estimation techniques. Section four presents results, and section five discusses the results, while section six concludes the paper and makes recommendations.

LITERATURE REVIEW

This section covers the reviews of the value-enhancing theory; concepts such as sustainability reporting, firm value, and accounting information timeliness. It also presents the results of the previous empirical studies obtained from the extant literature.

Theoretical/Conceptual Framework

The value-enhancing theory forms the theoretical bedrock of this study. The theory developed over time from the contributions of scholars in strategic management and sustainability practices, such as Schwartz (2012) and Porter and Kramer (2011). The theory was used to explain that while advancing sustainability conditions of the communities where firms operate, they can enhance firm competitiveness and value. This is because by integrating sustainability considerations into its core business strategies, a firm can increase its market value. So, such practices should not merely be seen as ethical obligations but also as strategic tools that contribute to long-term performance. Malik (2013) used the theory to establish the value-enhancing capabilities of sustainability activities, further supporting the idea that sustainability initiatives contribute to long-term profitability and competitiveness of firms. As applied to this study, the theory highlights the strength of transparent reporting and responsible practices in strengthening the relationships of a firm with its stakeholders and enhancing investors' confidence. The theory, therefore, supports research on the influence of sustainability reporting practices and the timeliness of financial information on stakeholders' perceptions towards firm valuation decisions.

The Global Reporting Initiative - GRI (2011) defines sustainability reporting as the practice of measuring, disclosing, and being accountable to internal and external stakeholders for firms' performance towards achieving sustainable development goals and relating to the social, environmental, and economic impacts of their operations. In addition, the Refinitiv Sustainability Index (2022) provides a framework for measuring sustainability using environmental, social, and governance (ESG) dimensions. The environmental dimension covers reporting a range of environmental health and safety (carbon emission, waste management, biodiversity, and energy & fuels, among others). Social issues relate to employee

health and safety, training and development, labour and industrial relations, diversity, equality, local community, etc., caused by the impacts of the operations and services of a firm (American Petroleum Institute-API, 2005). In addition, the governance dimension covers issues relating to management, corruption, board diversity, shareholders, risk management, ethics, and corporate social responsibility (CSR) strategy adopted by firms.

Firm value is accorded different meanings and interpretations in the literature, which makes the concept very controversial (Atanda et al., 2021). It refers to the sum of the actual market value of equity and estimated values of preferred stocks and debts (Morck *et al.*, 1988). This capital market approach indicates that firm value is an economic measure reflecting the market value of a whole business (Kurshev & Strebulaev, 2015). In this way, market capitalization (total market value of a company's outstanding shares or stocks) is often used to measure firm value by multiplying the total number of ordinary shares outstanding by their market price (Rajhans & Kaur, 2013). Employing a liability approach, firm value can be obtained as the sum of the claims by all claimants, such as creditors (secured and unsecured) and shareholders (preferred and common) of a firm (Ehrhard & Bringham, 2003). Another measure of firm value that is readily available is the accounting net worth, or book value of the assets of a firm that can be obtained from annual reports and accounts (Atanda et al., 2021). These explanations showed that firm value can be obtained through different measures, each of which is likely to give a value that differs from the others.

Timeliness is one of the qualities of accounting information with a significant value to stakeholders who require financial information for decision-making (Uthman et al., 2018). It refers to a requirement that helps to build trust, efficiency, and confidence in governance (Warrad, 2018). This is because any delay in releasing earnings information decreases the value of information efficiency (Hashim & Rahman, 2010). It can also allow a group of investors to have costly private information, which they will exploit to the detriment of the less-informed investors (Afify, 2009). Timeliness can be achieved through reporting accounting information on time and with sufficient regularity so as to fulfill users' economic decision-making needs (Ohaka & Akanni, 2017). Regulatory compliance approach is often used to measure accounting information timeliness based on the statutory requirement that listed firms must lay audited accounts before shareholders at the Annual General Meeting (AGM), which must be held within 90 days after the accounting year-end.

Studies like Raweh et al. (2019) and Atanda et al. (2023) measured timeliness using audit report lag, with the presumption that accounts must be audited before they can be presented to the public. This is the time lag between when accounts are ready at year-end and when they are audited and signed. Accounting information timeliness is therefore the difference between the accounting year-end and the date the audited accounts and report are signed (Raweh *et al.*, 2019). So, the shorter the number of days, the timelier the financial reports (Atanda et al., 2023). Figure 1 presents a diagrammatic representation of the interactions among the three dimensions of sustainability (ESG) reporting, accounting information timeliness, and two measures of firm value.

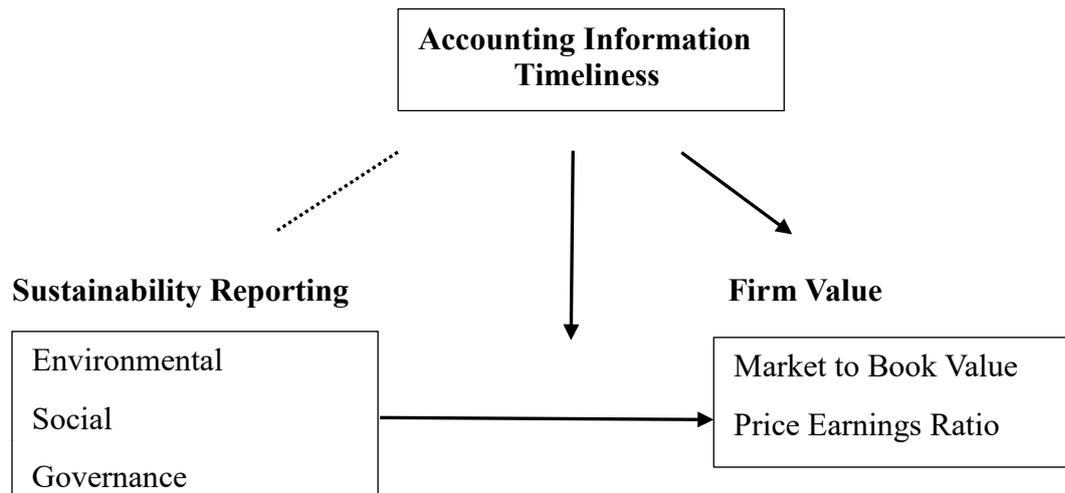


Figure 1. Sustainability reporting and accounting information timeliness as they relate to the firm value of nonfinancial listed firms.

Review of Empirical Studies

Many previous studies found a significant influence of sustainability reporting on firm value, while others found no significant results. For example, Hung et al. (2020) explored the impact of earnings quality and sustainability initiatives on firm value in Vietnam. Using panel data from listed firms over ten years, the study concluded that sustainability disclosures positively affect market valuation. Similarly, Busari et al. (2022) examined the value relevance of sustainability reporting in Nigerian financial firms. Employing a multivariate regression model, they found that firms with robust sustainability practices enjoyed higher firm value, measured through market-based indicators like Tobin's Q. Odoemelam and Obiora (2023) studied pharmaceutical firms in Nigeria and reported that consistent sustainability reporting correlates with increased dividend payouts, which indirectly enhance firm value.

Conversely, Ibeaja et al. (2023) observed mixed results in Nigeria's manufacturing sector, where environmental sustainability reporting improved market valuation in only select industries. Their findings stressed the importance of sector-specific strategies in leveraging sustainability initiatives. Atanda et al (2021) found consistent and strong evidence that banks with high overall sustainability and environmental sustainability disclosure tend to have low firm value, while the insignificant effect of economic sustainability disclosure suggested that its increase did not enhance firm value. The results led to the conclusion that overall sustainability and environmental sustainability disclosures were detrimental, rather than beneficial, to firm value and that sustainability reporting of deposit money banks in Nigeria did not enhance firm value; it only legitimized their operations.

Focusing on the relationship between accounting information timeliness and firm value, the study carried out by Anto (2023) found that timely reports contributed to better stock market performance. Their findings highlighted critical roles of timely financial disclosures in aligning market expectations with firm realities. Likewise, Adekunle et al. (2022) explored the influence of corporate ethics on the timeliness of financial reporting in Nigerian manufacturing firms. Using a panel data methodology, they demonstrated that timely reporting significantly enhances firm value by reducing information asymmetry. In the Middle East and North Africa, El-Diftar and Elkalla (2019) explored the value relevance of accounting information and

demonstrated that delayed disclosures reduced perceived reliability of financial information and adversely affected firm value. This aligned with the findings of Liu (2022), who explored public opinion on accounting firm reputation, financial reporting timeliness, and firm value. All these studies underscore the importance of timely disclosures in fostering investor trust.

In contrast, some studies established that the timeliness of accounting information did not always translate into higher firm value. Chukwu et al. (2019) reported that timely accounting disclosures of listed firms in Nigeria had limited effects on firm value unless accompanied by robust governance structures. Mixed results were obtained by Albersmann and Quick (2020), who examined the effect of audit quality indicators and timeliness of goodwill impairments on firm valuation in Germany. The authors noted that while timely impairments reduced investor uncertainty, they also signaled poor financial health, dampening firm value. Dalkılıç et al. (2021) examined the quality of accounting information in Turkey and found that the impact of timeliness on firm value was contingent on the broader economic environment.

Evidence from extant literature showed that some factors moderated the effect of sustainability reporting on firm value. Hartwig et al. (2023) analyzed the relationship between auditing timeliness and sustainability reporting in Swedish firms, highlighting how effective audits amplify the value-enhancing effects of sustainability disclosures. Additionally, Albersmann and Quick (2020) demonstrated that firms with higher audit quality produce more reliable sustainability reports, which positively influenced firm valuation. In the same vein, Handoyo and Anas (2024) examine the moderating effect of regulatory quality and government effectiveness on the influence of ESG on firm performance. The study enhanced our understanding of ESG impacts within the ASEAN context and emphasized the need to integrate ESG efforts with broader institutional support to achieve optimal firm performance.

Overall, the review demonstrated varying degrees of mixed results obtained on the intricacies of sustainability reporting, accounting information timeliness, and firm value. The studies underscored the importance of context, industry dynamics, and governance structures in shaping the effectiveness of sustainability reporting as a tool for enhancing firm value. The insights derived from the diverse geographic and methodological perspectives provided a robust foundation for further studies, especially in the Nigerian context. The potential reasons for the mixed results could also be attributed to the different measures employed for firm value, and partly to the differing regulatory environments that made sustainability reporting mandatory and non-mandatory, as well as the different sectors on which previous studies were carried out. The review further showed that more studies are needed on the moderating role of accounting information timeliness in the sustainability reporting-firm value relationship, especially in the context of Nigerian firms, using value-enhancing theory as a theoretical frame. With the exception of Adekunle et al. (2022), limited information is available on the role of accounting information timeliness in the relationship.

METHODOLOGY

Sample and Data

This study adopted a correlational research design since we investigated the relationships among variables of interest using historical data that cannot be manipulated by the researcher. Secondary data were collected from 76 out of 109 non-financial firms listed on the Nigerian Exchange Group (NGX) as of December 31, 2023, over the years 2011 to 2023. The firms were selected because they represent diverse industries where sustainability reporting is pertinent. Some nonfinancial firms were excluded because they were either delisted during the period

covered in this study or did not exist before the base year, 2011. We excluded the financial sector from the sample due to its distinct regulatory and operational structure. Therefore, purposive sampling techniques were employed. The technique ensures the inclusion of firms with complete data on key variables. The time frame was justified due to recent developments in corporate reporting practices, as well as regulatory changes that require sustainability and quality financial reporting in Nigeria.

Model Specification

This study employed two main static models: the direct effect models and the moderation models. Each model is specifically designed to provide feasible answers to research questions. The study employed a panel regression equation (1) to examine the effect of three dimensions of sustainability reporting (environmental disclosures, social disclosures, and governance disclosures) on firm value using price-to-earnings ratio (PER) and market-to-book Value (MBV) as proxies. By evaluating the coefficients of the explanatory variables, we ascertained how each of the dimensions individually and collectively influenced firm value. Control variables such as firm size (FSZ) and earnings per share (EPS) were included in the model to accurately isolate their influence from the influence of other factors on firm value. The control variables were selected based on their efficacy in predicting firm value, as demonstrated by studies such as Khoo et al. (2020), Atanda et al (2021), and Atanda (2017).

$$FVL_{itj} = \beta_0 + \beta_1 END_{it} + \beta_2 SOD_{it} + \beta_3 GOD_{it} + \beta_4 FSZ_{it} + \beta_5 EPS_{it} + \mu_{it} \dots (1)$$

It was *a priori* expected that all the explanatory variables would have a significant positive effect on firm value based on the proposition of value-enhancing theory. This model assumption means that the expected relationship between the three dimensions of sustainability reporting and firm value is a beneficial one. This indicates that a higher environmental, social, and governance sustainability index will lead to higher firm value, supporting the idea that sustainability initiatives contribute to the competitiveness and long-term profitability of firms (Malik, 2013).

The model for examining the relationship between accounting information timeliness and firm value is presented in equation (2). This aimed to ascertain whether or not the moderating variables have any significant impact on firm value.

$$FVL_{itj} = \beta_0 + \beta_1 ATM_{it} + \beta_4 FSIZ_{it} + \beta_5 EAPS_{it} + \mu_{it} \dots (2)$$

It was *a priori* expected $\beta_1 < 0$, that is, accounting information timeliness would have a significant negative effect on firm value. This is because the longer it takes a firm to prepare audited accounts (that is, the larger the audit lag), the higher the untimeliness of the accounting information. So, timely accounting information means low audit lag and high firm value, or untimely accounting information means high audit lag and hence, low firm value (negative relationship). The inclusion of accounting information timeliness (ATM) and interacting terms containing ATM and each of the three dimensions of sustainability reporting in equation (1) aimed at determining the moderating effect of the variable in the relationship between sustainability reporting and firm value is modelled using equation (3).

$$FVL_{itj} = \beta_0 + \beta_1 END_{it} + \beta_2 SOD_{it} + \beta_3 GOD_{it} + \beta_4 ATM_{it} + \beta_5 (END_{it} * ATM_{it}) + \beta_6 (SOD_{it} * ATM_{it}) + \beta_7 (GOD_{it} * ATM_{it}) + \beta_8 FSZ_{it} + \beta_9 EPS_{it} + \mu_{it} \dots (3)$$

Variables and Measurement

The variables in the models specified in this study were selected for their interconnectedness and relevance to firm financial performance, stakeholder engagement, and market valuation. Sustainability reporting was assessed based on disclosures related to environmental, social, and governance (ESG) practices, using indicators from the Refinitiv Sustainability Index for each dimension. To measure each dimension, quantitative content analysis was employed. We quantified the information obtained from the audited reports and accounts of the sample firms for each year based on the indicators in each dimension disclosed in line with Laskar & Maji (2018). Where a firm discloses an indicator, 1 was assigned, and otherwise, 0 was assigned. The average score was finally obtained for each dimension of sustainability reporting by dividing the total score obtained by the number of indicators in each dimension. Firm value was measured using two market-based indicators (market-to-book value and price-earnings ratio). Accounting information timeliness focuses on the promptness of financial reporting, an aspect critical to enhancing the quality and usability of the information disclosed. The variables were measured as indicated in Table 1.

Table 1: Measurement of Variables

	Variable	Measurement	Source
Dependent	Price/Earnings Ratio (PER)	Ratio of stock price to earnings per share	Hartwig et al. (2023)
	Market to Book Value (MBV)	Ratio of market capitalization to book value of equity	Adekunle et al. (2022)
Independent	Environmental Disclosures (END)	Average value of all the environmental content items disclosed in the financial statement following the indicators provided in the Refinitiv Sustainability Index.	Refinitiv Sustainability Index
	Social Disclosures (SOD)	Average value of all the social content items disclosed in the financial statement following the indicators provided in the Refinitiv Sustainability Index.	Refinitiv Sustainability Index
	Governance Disclosures (GOD)	Average value of all the governance content items disclosed in the financial statement following the indicators provided in the Refinitiv Sustainability Index.	Refinitiv Sustainability Index
Moderating	Accounting Information Timeliness (ATM)	Number of days between the financial year-end and the date the audited financial report and account is released, divided by the statutory number of days required, which is 90 days. The higher the ratio, the more untimely the financial report.	Hartwig et al. (2023)
Control	Firm Size (FSZ)	Natural logarithm of total assets	Atanda (2021; 2017)
	Earnings Per Share (EPS)	Profit after tax divided by the number of outstanding ordinary shares	Kumar. (2017)

Source: Prepared by the authors, 2025.

DATA ANALYSIS AND ESTIMATION TECHNIQUES

The panel data were analyzed using descriptive and inferential as well as econometrics tools. Olubusoye et al. (2016) encapsulated the merits of using panel data when they posited that panel data was suitable for controlling unobserved individual-specific effects caused by the heterogeneity of cross-sections in a sample, indicating that not controlling for these effects will often lead to biased estimates. Descriptive tools such as mean and standard deviation were employed to obtain information on the features typical of all variables. In addition, econometrics tests such as the normality test (Shapiro–Wilk) were carried out to verify whether the data followed a normal distribution, which is a key assumption for many parametric analyses. Similar tests, such as heteroskedasticity and endogeneity tests, were used to obtain information on the appropriate estimation technique to employ.

Again, inferential tools such as correlation and multiple regression were employed. Multiple correlation was used to test for the multicollinearity problem among explanatory variables, while the regression technique was used to examine the effect of the explanatory variables on the dependent variable. The static models were first estimated using the Ordinary Least Squares (OLS) regression technique, which served as a baseline estimation method, due to its simplicity and efficiency in handling linear relationships. The OLS technique assumes that error terms are homoscedastic (constant variance), uncorrelated with explanatory variables, and are normally distributed. The standard OLS estimation follows the principle of minimizing the sum of squared residuals to obtain the best linear unbiased estimates (BLUE). However, in panel data settings, OLS estimation is often inappropriate due to the presence of unobserved heterogeneity among firms, autocorrelation, and endogeneity issues that can bias the estimates. Given these limitations, the study employed the weighted least squares (WLS) regression technique.

Results

Descriptive Results

The descriptive results were as reported in Table 2. Sustainability reporting dimensions showed diverse reporting practices among the sampled firms. END had a mean of 0.103 (*s.d.* = 0.210), indicating a relatively low level of environmental disclosures among the firms, compared to the standard benchmark or expectation of 1.0. This result suggested limited emphasis or compliance regarding environmental sustainability practices and disclosures. SOD, with an average of 0.321 (*s.d.* = 0.166), indicated a moderate disclosure level, implying that the firms paid relatively more attention to social sustainability issues compared to environmental aspects. Similarly, GOD had a mean of 0.387 (*s.d.* = 0.203), suggesting that the firms prioritized governance-related information disclosures more than social and environmental disclosures. The standard deviation, in each case, indicated the rate of deviation of observations from their mean values.

ATM recorded an average value of 1.254 with a standard deviation of 1.067, which demonstrated variability in how firms quickly disseminate financial information. The minimum and maximum values of 0.130 and 10.380, respectively, suggested notable disparities in the timeliness of accounting information in the selected firms. This indicated that some of the firms reported financial information promptly, while others experienced substantial delays. The high variability might influence stakeholders' perceptions of the transparency and reliability of the information and thus having negative effect on firm valuation. High standard

deviation and range were also recorded in the case of firm value, which demonstrated heterogeneity in PER and MBV across the selected firms and over time.

Overall, the insights provided by the descriptive results showed a significant variability in firm value, sustainability reporting practices, and timeliness of accounting information among listed non-financial firms in Nigeria, with consequences on the attitudes and perceptions of the investors, regulators, and policy-makers towards the value attached to the shares of the firms in the capital market.

Table 2: Descriptive Statistics

Variable	Obs	Mean	Std. Dev.	Min	Max
Per	987	9.532	49.443	-552.500	612.670
Mbv	987	2.929	15.253	-176.190	249.590
End	987	0.103	0.210	0.000	1.000
Sod	987	0.321	0.166	0.000	1.000
God	987	0.387	0.203	0.000	1.260
Atm	987	1.254	1.067	0.130	10.380
Fsz	987	7.108	0.896	4.520	9.500
Eps	987	1.687	7.164	-32.570	93.250

Source: *Authors' computations (2025).*

Normality Test Results

Normality was a fundamental assumption underlying parametric statistical analyses because the method relies on the assumption that the residuals from regression models are normally distributed. Using techniques such as Shapiro-Wilk, Kolmogorov-Smirnov, or Jarque-Bera tests, the p -values of each variable must be greater than 0.05 to demonstrate that the data distribution is symmetrical and does not significantly deviate from normality. Where the P -value is less than 0.05, it means there is a significant deviation from normality, reflecting the presence of skewness or kurtosis within the dataset, which might have stemmed from outliers, extreme observations, or inherent variability, which are common to financial data.

The results presented in Table 3 showed that none of the variables of interest in this study were normal due to the significant nature of their P -values, which were less than 1 percent. Thus, the normality assumption of the OLS technique, a parametric technique, has been violated. There is a need for corrective measures that will ensure robustness and accuracy of statistical interpretations, such as data transformations (logarithmic or square root) to stabilize variances and reduce skewness, and Winsorization to limit the influence of extreme values by adjusting outliers to more moderate levels. Alternatively, non-parametric statistical methods, which are free from normality assumptions, may be employed.

Table 3: Shapiro-Wilk Data Normality Results

Variable	Obs	W	V	Z	Prob.>z
per	987	0.459	337.192	14.407	0.000
mbv	987	0.225	482.976	15.296	0.000
end	987	0.892	67.337	10.419	0.000
sod	987	0.968	19.959	7.410	0.000
god	987	0.983	10.634	5.851	0.000
atm	987	0.531	292.107	14.051	0.000
fsz	987	0.992	5.100	4.033	0.000
eps	987	0.467	332.385	14.371	0.000

Source: *Authors' computations (2025).*

Multicollinearity Test Results

The data in Table 4 describes the results of the multicollinearity test carried out using the Spearman Rank correlation due to a normality problem. The data indicated that all observed associations, especially among the explanatory variables, were weak and moderate below 0.8, which is the benchmark provided by Lewis-Beck (1993), a rule of thumb, for the existence of multicollinearity among variables. The results, therefore, suggested a low likelihood of severe multicollinearity issues. Nevertheless, to conclusively confirm the absence of a multicollinearity problem among the variables, the variance inflation factor (VIF) test was also carried out on the OLS models. The results also confirmed the absence of a multicollinearity problem among the explanatory variables using the commonly accepted threshold of 10, in line with the recommendations of Gujarati (2004). This also confirmed that none of the explanatory variables were excessively correlated with one another and that all variables were included in regression models.

Table 4: Spearman's Rank Correlation Results

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
(1) per	1.000							
(2) mbv	0.395	1.000						
(3) end	0.091	0.176	1.000					
(4) sod	0.209	0.168	0.334	1.000				
(5) god	0.208	0.157	0.089	0.530	1.000			
(6) atm	-0.133	-0.176	-0.222	-0.169	-0.106	1.000		
(7) fsz	0.207	0.174	0.328	0.448	0.404	-0.077	1.000	
(8) eps	0.536	0.271	0.208	0.326	0.274	-0.168	0.464	1.000

Source: *Authors' computations (2025).*

Regression Results

To investigate the relationship between sustainability reporting and firm value, the study employed robust Weighted Least Squares (WLS) regression analysis. The technique was crucial given the identification of heteroscedasticity, which can undermine the accuracy and reliability of OLS regression estimates. Consequently, the study presented and discussed findings from both WLS regression and the initial pooled OLS regression outcomes for

comparison. Table 5 represents the results obtained from the estimation of equation (1), focusing first on the pooled OLS regression. The results indicated that the dependent variable of firm value (PER), had an adjusted R-Square value of 0.207. This implied that the independent variables, along with control variables, collectively explained about 21% of the systematic variations in firm value. Similarly, when firm value was measured using MBV, the adjusted R-Square value was 0.272, indicating that the independent and control variables accounted for about 27% of the systematic variations in firm value, while the unexplained variations in firm value were captured by the error term.

These statistics demonstrated the extent to which changes in the three dimensions of sustainability reporting could be used to explain changes in the two measures of firm value. So, about 21 percent and 27 percent changes in price earnings ratio and market to book value of the sample firms, respectively could be explained by the changes in environmental sustainability indicators such as environmental health and safety, carbon emission, waste management, biodiversity and energy & fuels; social sustainability indicators such as employee health and safety, training and development, labour and industrial relations, diversity, equality, and local community; and governance sustainability indicators such as management, corruption, board diversity, shareholders, risk management, ethics, and corporate social responsibility (CSR) strategy.

The assumption of homoscedasticity in the pooled OLS results was tested using the Breusch-Pagan test. The data in Table 5 further showed a heteroscedasticity test statistic (Hetttest) of 68.26 with a *P*-value of 0.000 for the PER model and 1452.92 with a *P*-value of 0.000 for the MBV model. The results indicated that the assumption of homoscedasticity was violated at the 1% significance level, which suggested that the variance of the error terms was not constant across observations, and this could affect the reliability of standard errors and confidence intervals in the OLS estimates. To address this issue, the study adopted the Weighted Least Squares (WLS) estimation, as recommended by Wooldridge (2010), which provided robust standard errors to correct for heteroscedasticity.

The results in columns 2 and 4 of Table 5 showed a slightly higher R-Square value of 0.221 for the PER model and 0.283 for the MBV model. These showed that that 22% and 28% of the systematic variations in the two measures of firm value, respectively, were explained by the explanatory variables. The improvement suggested that the robust regression provided more accurate and reliable estimates, correcting for the heteroscedasticity observed in the OLS results. The robust regression results confirmed the statistical significance of several variables, further validating the findings of the study and ensuring more robust statistical inferences. A similar procedure was adopted to analyze the effect of accounting information timeliness on firm value. The data in columns 1 and 3 of Table 6 showed adjusted R-squares of 0.203 and 0.270 for PER and MBV, respectively. These showed that about 20% of the variations in PER were due to the influence of the explanatory variables combined, while the explanatory power of accounting information timeliness and control variables was about 27%, and the rest 80% and 73% of the variations were due to factors outside the two models.

The assumption of homoscedasticity in the pooled OLS model was also tested using the Breusch-Pagan test, and results showed a heteroscedasticity test statistic (Hetttest) of 34.82 with a *P*-value of 0.000 for the PER model and 1362.96 with a *P*-value of 0.000 for the MBV model. These results indicated that the assumption of homoscedasticity was violated at the 1% significance level in the two models. This violation suggested that the variance of the error terms was also not constant across observations, which could affect the reliability of standard errors and confidence intervals in the OLS estimates. The study then adopted the Weighted

Least Squares (WLS) estimation technique to obtain robust standard errors to address the heteroscedasticity problem, as recommended by Wooldridge (2010).

Table 5: Sustainability Reporting and Firm Value

Variables	PER OLS	PER WLS	MBV OLS	MBV WLS
End	-7.638 (0.373)	1.314 (0.495)	-1.948 (0.446)	0.581*** (0.002)
Sod	-2.971 (0.808)	7.480*** (0.006)	-1.099 (0.763)	0.003 (0.992)
God	14.565 (0.115)	4.676** (0.024)	3.099 (0.261)	0.468** (0.018)
Fsz	0.391 (0.854)	0.885 (0.064)	1.086 (0.088)	0.031 (0.500)
Eps	0.293 (0.209)	0.359*** (0.000)	0.499*** (0.000)	0.032*** (0.000)
Intercept	2.353 (0.864)	-4.945 (0.109)	-6.279 (0.126)	0.512 (0.081)
Observations	987	987	987	987
Adjusted R ²	0.207	0.221	0.272	0.283
Hetttest.	68.26		1452.92	
P-value (hetttest.)	{0.000}		{0.000}	
VIF	1.40		1.40	

Notes: *p*-values are in parentheses. *** *p*<.01, ** *p*<.05

Source: Authors' computations (2025).

The results from the robust regression were presented in columns 2 and 4 of Table 6, which showed an adjusted R-Square of 0.205 for the PER model and 0.202 for the MBV model, indicating about 21% and 20% of the systematic variations in firm value, respectively, were explained by the independent variables of the two models. The improvement in the estimates also suggested that the robust regression models provided more accurate and reliable estimates than those provided by the OLS models, validating the statistical significance of the explanatory variables and robust statistical inferences. With these significant results obtained on the relationship between accounting information timeliness and firm value, which supported *a priori* expectation, it can be inferred that the timeliness of accounting information (low audit time lag) tends to bring about increased firm value. Therefore, accounting information timeliness could be seen to possess information content and predictive power that can moderate the effect of sustainability reporting on firm value.

To assess the moderating effect of accounting information timeliness on the relationship between sustainability reporting and firm value, we also employed both the pooled OLS and WLS techniques to estimate models. We included the moderating variable, that is, accounting information timeliness, and interaction terms containing environmental disclosures, social disclosures, and governance disclosures in the PER and MBV models, earlier analyzed, and the results were reported in Table 7. The table showed that while the OLS results suffered a heteroscedasticity problem, like other models estimated, the WLS provided robust estimates.

Table 6: Accounting Information Timeliness and Firm Value

Variables	PER	PER	MBV	MBV
	OLS	WLS	OLS	WLS
Atm	1.043 (0.480)	-1.119*** (0.001)	0.138 (0.754)	-0.162*** (0.000)
Fsz	0.891 (0.630)	1.841*** (0.000)	1.130** (0.041)	0.133*** (0.001)
Eps	0.321 (0.166)	0.382*** (0.000)	0.503*** (0.000)	0.035*** (0.000)
Intercept	1.349 (0.919)	-6.012** (0.048)	-6.124 (0.122)	0.208 (0.465)
Observations	987	987	987	987
Adjusted R ²	0.203	0.205	0.270	0.202
Hetest.	34.82		1362.96	
P-value (Hetest.)	{0.000}		{0.000}	
VIF	1.07		1.07	

Notes: *p*-values are in parentheses. *** $p < .01$, ** $p < .05$

Source: Authors' computations (2025).

With the Hetest statistics of 34.82 (.000) for the PER model and 1362.96 (.000) for the MBV model, the assumption of homoscedasticity was violated in the two models, which suggested that the variance of the error terms was not constant across observations, and the use of a better estimation technique is needed to address the problem. The adjusted R-square values under pooled OLS for the two proxies of firm value of 0.012 and 0.074, respectively, were lower compared to 0.135 and 0.122 obtained when the WLS technique was employed. However, the estimates obtained for the MBV model demonstrated more significant effects than for the PER model. This therefore showed a stronger predictive ability of accounting information timeliness on market value to book value of assets than for the price–earnings ratio, though the two measures were market ratios.

Table 7: Sustainability Reporting and Firm Value: The Role of Accounting Information Timeliness

Variables	PER OLS	PER WLS	MBV OLS	MBV WLS
End	-3.841 (0.740)	3.963 (0.122)	0.863 (0.803)	1.036*** (0.000)
Sod	1.462 (0.932)	6.001 (0.113)	-1.434 (0.779)	-0.593 (0.100)
God	32.674** (0.016)	3.546 (0.237)	3.017 (0.455)	0.934*** (0.001)
Atm	7.994** (0.039)	-1.132 (0.188)	0.527 (0.648)	-0.083 (0.310)
atm × end	-4.279 (0.476)	-1.260 (0.343)	-2.036 (0.256)	-0.380*** (0.003)
atm × sod	-2.730 (0.793)	0.917 (0.691)	0.357 (0.909)	0.531** (0.016)
atm × god	-15.743 (0.068)	0.298 (0.876)	-0.248 (0.923)	-0.481*** (0.008)
Fsz	0.331 (0.877)	0.952** (0.045)	1.123 (0.079)	0.053 (0.238)
Eps	0.268 (0.254)	0.359*** (0.000)	0.508*** (0.000)	0.032*** (0.000)
Intercept	-7.109 (0.626)	-3.656 (0.258)	-7.147 (0.101)	0.475 (0.122)
Observations	987	987	987	986
Adjusted R ²	0.012	0.135	0.074	0.122
Hetest.	10.13		1524.04	
P-value (Hetest.)	{0.002}		{0.000}	
VIF	4.04		4.04	

Note: P-values are in parentheses. *** $p < .01$, ** $p < .05$

Source: Authors' computations (2025).

Discussions

Results from data analysis indicated that the effect of sustainability reporting on firm value varied across the three dimensions of reporting. Environmental reporting did not have any significant impact on firm value, measured by price-to-earnings ratio, suggesting that investors did not factor environmental disclosures into their immediate earnings-based valuation decisions. This aligned with Madugba et al. (2020), who found that environmental sustainability reporting in Nigeria's oil sector was compliance-driven rather than an enhancing value tool. However, the significant positive effect of environmental reporting on market-to-book value suggested that firms with strong environmental disclosures were rewarded in asset valuation. This finding resonated with Ishak (2024), who established that investors tend to favour firms with long-term sustainability activities and policies, leading to higher valuation. This implied that enhanced environmental disclosures strengthened firm valuation.

The significant positive result pointed to the need to improve the credibility and transparency of environmental disclosures through qualitative and quantitative reporting of environmental sustainability initiatives and activities because shareholders' prosperity is reflected in firm value. Credible environmental disclosures help to provide information on a firm's environmental risks, impacts, and opportunities, which can help to reduce information asymmetry, enhance investors' confidence and trust, and attract long-term responsible capital (Kruger, 2015) needed to outperform competitors in long-term profitability and firm value. The firm would be more likely to be rewarded by investors, especially during the period of uncertainty, its reputation bolstered and continued operations supported (Eccles et al., 2014), especially when the firm operates in environmentally-sensitive sectors such as agriculture, energy, mining, and industrial or manufacturing.

The positive effect of social reporting on the price-to-earnings ratio, which is a short-term measure of firm value, indicated that firms that engaged in strong social sustainability initiatives tend to be valued more by investors. This supported the position of Erin et al. (2021), who found that sustainability reporting significantly influenced investors' confidence as they perceived firms with well-documented social sustainability initiatives as less risky and more ethical, making them attractive for investment. However, the non-significant relationship between social sustainability reporting and market-to-book value suggested that investors did not necessarily view social sustainability as fundamental to a firm's intrinsic worth in the long-term. This contradicts the findings of Busari et al. (2022), who emphasized the lack of long-term value relevance of social sustainability practices in Nigerian firms.

Governance disclosures exhibited a significant positive effect on the two measures of firm value, reinforcing the notion that strong governance structures are crucial in shaping investors' confidence and value attached to firms. This was consistent with the findings of Odoemelan and Obiora (2023), who found that higher levels of governance disclosures enhanced dividend payout policies and firm valuation in Nigeria. It also aligned with the argument of Song and Zhou (2021), who demonstrated that governance-related disclosures boosted investors' trust and reliance on financial information.

Results further showed that accounting information timeliness had a significant negative effect on firm value. This indicated that an increase in the number of days it takes to prepare a financial report, which means untimely accounting information, led to lower firm value. The result supported the conventional expectation that timely financial disclosures enhanced investor confidence and firm valuation. The negative association of accounting information timeliness with price-to-earnings ratio suggested that investors perceived timely disclosure of financial information as being reliable, potentially with no concerns about the accuracy of the reported figures. The result contradicts the findings of Khoo et al. (2020) that firms with early accounting information faced greater scrutiny, which calls for the need to balance the timeliness of accounting information with accuracy to maintain a high level of reliability and integrity.

The negative impact of accounting information timeliness (increased number of days it takes to prepare a financial report) on market-to-book value suggested that firms that delayed in releasing financial information caused investors to discount the value of the firm's assets. The result also contradicted the concerns raised by Benyoussef and Drira (2019), who found that premature disclosures could lead to restatements and subsequent erosion of investor trust. The results suggested that when reports are released too late, they reflected the depth required for accurate valuation, leading to positive market reactions. The finding, however, supported the perception that early release of financial information is always beneficial, as found by Adekunle et al. (2022).

Moreover, the moderated regression results indicated that accounting information timeliness (the number of days it takes to prepare a financial report) had a significant negative moderating effect on the relationship between environmental sustainability reporting and firm value, when measured by market-to-book value. This indicated that early release of financial reports weakened any significant negative impact of environmental disclosures on firm value, or that delays in releasing financial information reduced the positive impact of environmental disclosures on firm value. This is because investors perceived early reporting of sustainability information as reliable and complete, which is a signal to them that the reporting firm should be valued highly and therefore a support to the position of both the signaling theory and value-enhancing theory.

The result, however, contradicted the argument of Khoo et al. (2020), who emphasized that corporate reputation played a significant role in how timely disclosures are perceived. This is because investors tend to doubt the credibility of sustainability disclosures that are rushed, leading to skepticism about the firm's sustainability efforts. The finding had important implications for managers, as it suggested that while early release of financial reports is a critical factor, it should not come at the expense of the quality and depth of environmental disclosures.

The moderating results also indicated that accounting information timeliness enhanced the positive effect of social reporting on firm value when measured using market-to-book value. This means that the longer it takes to prepare financial information will enhance the positive effect of social disclosures on firm value, especially the market-to-book value of firms. This suggested that when firms took their time in reporting financial information, improved quality of social disclosures strengthened investors' confidence and increased market valuation. This showed that investors expected firms to pay attention to details while preparing a report on social sustainability activities, which can cause delays in rendering accounting information. The finding therefore supported the position of Erin et al. (2021), who found that corporate governance and sustainability reporting quality significantly influenced investors' perceptions, which is the fulcrum of the signaling theory.

The negative moderating effect of accounting information timeliness on the relationship between governance sustainability reporting and firm value means that an increase in the number of days it took to present accounting information made governance disclosures valueless. This suggested that delayed financial disclosures weaken the positive impact of governance-related sustainability information on firm value. It also implied that investors perceived governance disclosures made under relaxed reporting timelines as less credible or lacking sufficient details. The finding supported Albersmann and Quick (2020), who argued that timely financial disclosures improved the perception of corporate governance strength. However, it contradicts the concerns raised by Lukason and Miñano (2020), who found that firms with governance-related reporting violations often rushed their disclosures to meet deadlines, resulting in lower investors' confidence. This has strategic implications for the management of a firm, as firms must ensure that governance disclosures are not only timely but also comprehensive and transparent.

CONCLUSIONS AND RECOMMENDATIONS

This study investigated the moderating role of accounting information timeliness on the relationship between sustainability reporting dimensions and firm value, using data collected from 76 nonfinancial listed firms in Nigeria, covering the period 2011 to 2023. The study was

anchored on signaling and value-enhancing theories and employed descriptive, inferential, and econometric tools to analyze data using the weighted least squares (WLS) technique for estimation. Results showed a significant positive impact of governance disclosures on the two measures (price-earnings ratio and market-to-book value) of firm value, a significant positive impact of social disclosures on price-earnings ratio, and a significant positive effect of environmental disclosures on market-to-book value, on the one hand, and a significant negative impact of accounting information timeliness on the two measures of firm value.

Considering the moderating role of accounting information timeliness, the moderated regression results showed that delays in providing accounting information were detrimental to the value of a firm, even when the firm has a robust sustainability reporting framework. It is reasonably concluded that both sustainability reporting and accounting information timeliness were value-enhancing with a significant predictive ability on firm value, and that early reporting of financial information can be used to address any significant negative impact or enhance any significant positive impact of sustainability reporting on firm value, especially the market-to-book value of firms. These have some policy implications for the managers, investors, and regulators alike.

In the first instance, managers need to integrate social sustainability activities into the core business strategy of their firms rather than treating them as isolated corporate social responsibility initiatives just to meet investors' expectations. The need to prioritize governance reforms in areas such as board effectiveness, audit quality, and risk management was also stressed by the results. In line with the demands of governance disclosures, firms' internal controls should be robust enough to support early reporting, and more reliance should be placed on governance disclosures when assessing firm value.

Secondly, sustainability disclosures should be considered as an indicator of long-term stability of a firm since the three dimensions of sustainability reporting had a significant positive influence on firm value. Given the significant results on governance disclosures, higher governance standards should be demanded by investors. They should push for greater transparency in social sustainability activities and initiatives, since their disclosures significantly enhanced firm value. Investors with long-term investments should emphasize the quality of governance disclosures and timely social disclosures as signs of transparency and commitment to sustainability reports. Investors also need to be cautious when interpreting social and environmental sustainability reports that are released early, as the information may not fully capture the firm's long-term sustainability strategy.

In addition, regulators should formulate policies that ensure the credibility and reliability of environmental disclosures. Mandating certain sustainability disclosures to standardize reporting practices across industries is necessary to further enhance the value relevance of reports. Reporting guidelines are needed to uphold financial reporting integrity, and the guidelines should ensure that firms provide comprehensive and verifiable environmental information rather than qualitative information that lacks supportive evidence. There is therefore the need for firms to always substantiate their sustainability claims using a more robust reporting frameworks that provide quantitative information.

A major limitation of this study is the lack of coverage of all the nonfinancial listed firms in Nigeria and the nonavailability of sustainability reporting data, as not all listed firms disclosed their ESG activities consistently throughout the study period, since sustainability reporting is currently voluntary in Nigeria. This led to a limited sample size, which can affect the generalizability of the findings. The study was also constrained by focusing on nonfinancial

listed firms in Nigeria, which prevented us from capturing the dynamics of the three dimensions of sustainability disclosures and firm value in other economies. These limitations, therefore, suggested caution when applying the findings of this study to different contexts.

Future studies should expand the scope of this research to cover other countries. This will allow a wider view of the value-relevance of sustainability reporting, and accounting information timeliness, and make it possible to conduct a comparative analysis across different regulatory environments. Additional study should incorporate qualitative methods like interviews to gain deeper insights from investors on how sustainability reporting and accounting information timeliness influence investment decisions. Further research could also explore industry-specific effects, as the impact of sustainability reporting may vary among sectors. Future studies can also focus on the moderating role of digital financial reporting in the relationship between ESG and firm value, and ascertain how technologies helped to improve the timeliness quality of ESG disclosures.

ACKNOWLEDGEMENT



We are grateful to Providus Bank Nigeria Limited for sponsoring our attendance at the 2025 International Conference of Accounting and Business held at Cape Town, South Africa on 19-20th June, 2025. We are also grateful to the anonymous reviewers and participants at the conference for their valuable suggestions towards improving the quality of this paper.

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